Remarks:

Claims 1-14 are pending in the application. Applicants thank the Examiner for noting the allowability of claims 4 and 8. Through the claim amendments above, and the Remarks that follow, all grounds for objections and rejections are removed.

New claims 12-14

The limitations of claims 4 and 8 have been rewritten in independent format as new claims 13 and 14. A new claim 12, dependent from claim 1, as amended, has been added without introducing new matter to the application.

Claim Rejections under 35 U.S.C. §103(a)

Claims 1, 3, 5-7 and 9-11 were rejected under 35 U.S.C. §103(a) as being unpatentable over Kryzaniwsky[1] in view of Blohowiak[2]. More specifically, with regard to claim 1, the Action states that Kryaniwsky teaches all the limitations of the presently claimed invention but for the forming of a direct covalent bond at a temperature less than 475 °C between the electrical conductor and the dielectric material. The Action further states that Blohowiak teaches the direct covalent bonding at a temperature less than 475 C for improving adhesion between metal and resin/dielectric material, and that it would have been obvious to one of ordinary skill in the art to modify Kryzaniwsky by forming a covalent bond between the dielectric material and conductive material for improving adhesion between metal and resin/dielectric material.

Applicants respectfully traverse this rejection on several grounds.

(a) Applicants respectfully submit that Blohowiak is not an appropriate reference to use in rejecting the present claims. The present application claims priority to U.S. Patent 5,707,715,

[1] U.S. Patent No. 5,227,338 issued 13 July 1993 to Bohdan R. Kryzaniwsky

[2] U.S. Patent No. 5,849,110 issued 15 December 1998 to Blohowiak, *et al.*

which has a filing date of August 29, 1996, which pre-dates the November 4, 1996, filing date of Blohowiak.

(b) Claim 1, as amended, recites

> *A method of constructing a composite structure for use with at least one semiconductor device, comprising the steps of:*
>
> *providing at least one electrical conductor to form a portion of an electrical network;*
>
> *providing at least one thermal conductor to form a portion of a thermal network; and*
>
> ***applying a ceramic dielectric material to said electrical conductor by forming a direct covalent bond at a temperature less than 475 degrees C between said electrical conductor and said dielectric material, said thermal network and said electrical network being encompassed by said dielectric material.*** [emphasis added]

First, there appears to be no explicit or inherent motivation to combine the teachings of the references. The combination appears only in hindsight after review of the Applicants' disclosure. Blohowiak is not directed to a process that "encompasses" a thermal network and an electrical network with a dielectric material. Blohowiak only teaches a process for improving the adhesion of a resin or adhesive to a metal. The Action's citation to column 2, lines 62-66 in Blohowiak demonstrate that Blohowiak is clearly concerned with a "surface treatment", and Blohowiak provides examples of the "resins or adhesives" the coating is intended to be an adherent for (at column 19, lines 5-15), including "surface coatings (paints), especially urethane coatings, that are useful in aerospace applications." Applicants respectfully submit that the disclosure of Blohowiak's paint binders is not properly extendable to the realm of "semiconductor devices"; there is no explicit or inherent motivation to make such an intellectual leap, nor is there any reasonable expectation that applying the surface treatments of Blohowiak are technologically feasible in the multidimensional conductor and thermal networks recited in claim 1, or that such application would have the desired electrical insulative/isolative effect. Kryzaniwsky similarly

fails to teach "encompassing" the conductor and thermal networks as recited in claim 1. Kryzaniwsky discloses a laminate employing "drilled PTFE dielectric sheets" and encapsulation with an "epoxy fill" (column 3, lines 30-50), rather than a dielectric formed in-situ through a chemical process that encompasses the conductor and thermal networks. This is a structural difference that potentially has significant effect upon both the conductive and thermal efficiencies of the semiconductor device.

(c) Claim 1 has been added to more clearly indicate that the dielectric material is a ceramic dielectric.

The Action asserts, with respect to claims 6, 7 and 9, that the choice of alumina-based ceramics, silica-based ceramics, or organo-ceramics, would have been an obvious design choice, "since Applicants have not disclosed the specified dielectric materials solve any stated problem, or are for any particular purpose."

Applicants respectfully submit that the Action misreads Applicants' specification. Paragraph [0021] reads "Silica ceramic phases are particularly preferred to reduce the level of signal attenuation through dielectric loss mechanisms at higher signal frequencies." Paragraph [0005] states that the networks are to be "embedded within a low dielectric ceramic, such as silica or alumina." And paragraph [0055] reads "Alumina, with a relative dielectric permittivity of 10, and silica with a relative dielectric permittivity of 3.8, are preferred ceramic phases because of their ability to limit dielectric loss, thereby allowing electronic signals, in the case of a pure silica ceramic member, at frequencies as high as 1.2-1.5 GHz to be propagated through the electrical interconnection network **24**."

These recitation clearly demonstrate objectives of the presently claimed invention, and the usefulness of ceramics in achieving these objectives. In contrast, neither Kryzaniwsky nor Blohowiak teach or suggest the use of ceramics as the encompassing dielectric material.

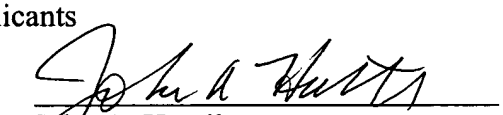
It is not clear that the motivation for combining the teachings of Kryzaniwsky and Blohowiak exists in the art. Furthermore, neither reference teaches, either alone or in the aggregate, the limitations of claim 1 as amended, and thus claims 2-12 that depend from claim 1. The Action suggests that "increasing bonding strength between materials" is an advantage of

combining the cited references. Applicants respectfully indicate that an advantage, if one even exists, that a substitution provides does not by itself obviate the substitution. That is, an increased bonding strength advantage in hindsight does not provide an independent basis for substitution. Furthermore, in this case, Blohowiak does not even supply the teachings missing from Kryzaniwsky to obviate the presently claimed invention.

For at least the reasons discussed above, Applicants respectfully submit that the amendments and remarks herein establish the patentability of claims 1-14, and request reconsideration and withdrawal of all outstanding objections and rejections to the disclosure and claims. Favorable consideration and allowance of the pending claims are earnestly solicited. Should there be any questions after reviewing this paper, the examiner is invited to contact the undersigned at 617-854-4000.

Respectfully submitted,
L. PIERRE DEROCHEMONT, *et al.*
Applicants

Dated: April 5, 2005

By: 
John A. Hamilton
Reg. No. 48,946
Attorney for Applicants